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Nests of the Mason Bees *Osmia tanneri* Sandhouse and *O. longula* Cresson with a Description of the Female of *O. tanneri*

(Hymenoptera: Megachilidae)

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The nesting habits of western mason bees are mostly unknown though Hicks (1926) stated that *O. integra* (Cresson) [reported as *novomexicana* (Cockerell)] made mason nests under flat stones and Stephen *et al.* (1969) described *Osmia* nests coated with mud that were constructed in cracks in split rocks. *O. nigrifrons* Cresson makes mason nests in a variety of situations (Rust *et al.*, 1974). Recently while I was searching under stones for nests of the pollen-collecting wasps, *Pseudomasaris* (Parker, 1967), I found nests of two species of mason bees, *Osmia tanneri* Sandhouse and *O. longula* Cresson.

Osmia (*Centrosmia*?) *tanneri* Sandhouse

(Figs. 1–4)

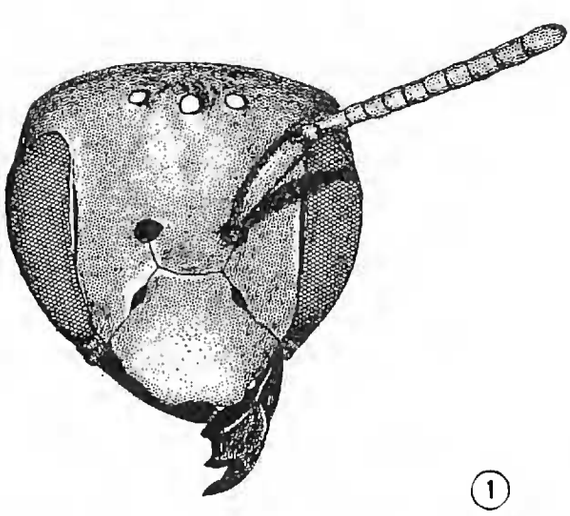
Sinha (1958) revised the subgenera of *Osmia* and placed *O. tanneri* in (*Centrosmia*). However, the female of *O. tanneri* will not key to this subgenus because it has a 3-toothed mandible (Fig. 1) instead of the 4-toothed condition found among known females of (*Centrosmia*). The need for a comprehensive revision of these important pollinators is evident when 28 of our Nearctic species cannot be placed to subgenus (Sinha, 1958)! Because sex association in this genus is quite difficult and is one of the factors limiting a better understanding of the classification, a description of *O. tanneri* females is given.

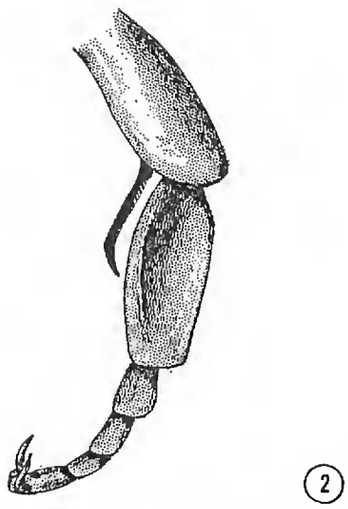
Females. Black, one specimen with bluish band across frons above base of antennae; wings lightly stained, darker posteriorly. Pubescence mostly dark brown, uniform length longer than last 2 flagellomeres; scutum, scutellum with dense off-white hair with narrow lateral border of dark hair; tergites I–II with off-white hair scattered across dorsal surface, rest of abdomen with black stiff setae except

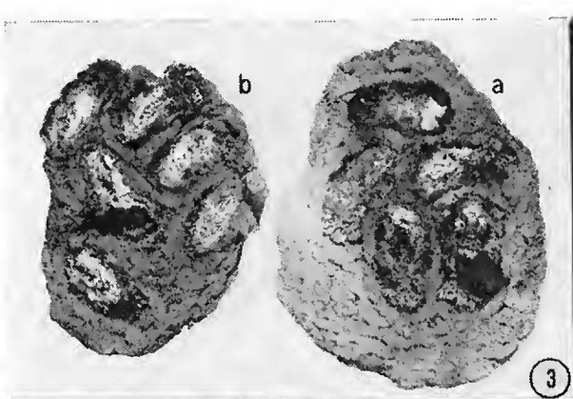
shorter, brownish, plumose setae apically on sixth tergite and sternite; legs with long brownish hair, inner surface of basitarsi with short dense pubescence, thinner on outer surface, setae longer, especially front basitarsus; tarsal spurs long, thin, slightly bent subapically with dense inner row of small teeth, spurs longer than half length of basitarsus; minute tufts of amber hair beneath lateral clypeal margin; labrum with apical bowed row of erect setae. Punctation of head coarse, contiguous, denser on clypeal margin, mandibles, above base of antennae, between lateral ocelli; smooth micropunctate below median ocellus, outer side of lateral ocellus; pits on thorax as on head but those on pleura shallow, pits on disc of scutum sparse; propodeum shallowly pitted, enclosure shagreen; pits on abdomen more obscure except scopal hair pits deep, round; abdominal terga, sterna I–V with apical impunctate shagreen band less than ⅕ width of segment. Scape cylindrical, ⅕ as wide as long, flagellomere I longer than II, III, IV, or V, ultimate flagellomere longest; clypeus produced below margin of compound eyes (Fig. 1), laterally clypeal margin sinuate, narrowing medially, clypeal margin medially subtruncate with slight median emargination; mandible 3-toothed (Fig. 1), apical tooth more slender, longer, farther apart than inner ones, inner margin of mandible between outer teeth deeply cleft, breadth of dentate margin 1.3 × basal width, lower mandibular carinae fading just more than half distance from dentate margin to base of mandible; interantennal distance shorter than antennocular distance; face as long as broad; ocellocular distance 1.6 × least interocular distance; distance between lateral ocelli equal to distance from one to edge of vertex; lateral ocelli above line drawn between apical ocular margins; head narrower than thorax (viewed from dorsum); face flat except for produced apical clypeal margin; narrow carina bordering inner ocular margin; declivity of tergite I without carina, with shallow longitudinal micropunctate depression; apical margin of tergite VI rimmed medially; legs stout, basitarsus longer than all other tarsomeres combined, hind basitarsus flattened (Fig. 2), dilated medially, 2.3 × as long as wide; length of body 10 mm, wings 7 mm. Two females are in the collection of the Bee Biology and Systematics Laboratory.

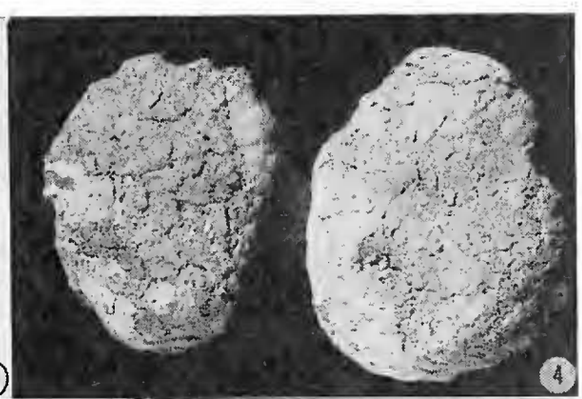
Nesting Site.—A barren ridge with scattered pieces of broken flat stones scattered among stunted sage near the summit of Wellsville Mt, 8,000 ft., Cache Co., Utah. Although many stones were turned over, only 2 nests were found—both beneath the same slab of rectangular slate; the underside of the stone was concave, and the nests were adjacent near the middle of the cavity.

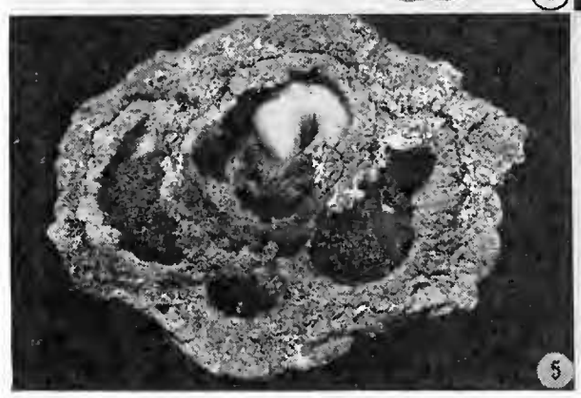
Nest Construction.—Nests were made entirely from mud. The surface of the rock was the ceiling of the cells; the walls were built by making and extending rings of elongate fused pellets of mud, but individual loads of mud were distinguishable (Fig. 3). After one cell was completed, additional cells were attached to the first by using portions of its walls to form walls of adjacent cells (Fig. 3a, b). Thus, in one nest the oval cell walls of the first cell served as portions of the walls of three adjacent cells (Fig. 3a). In the other nest, all the cells were attached to the central cell (Fig. 3b). Additional rings of mud were added











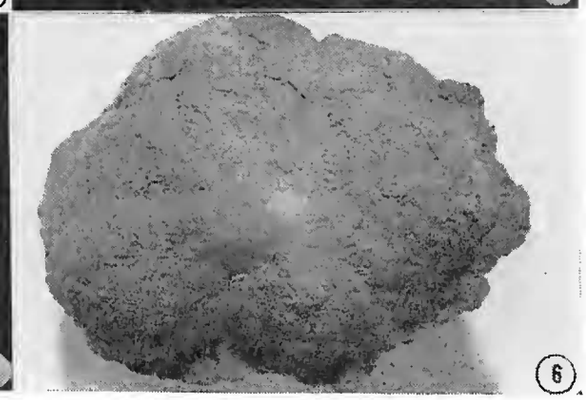


FIG. 1. Front view of female *Osmia tanneri*.

FIG. 2. Part of hind leg of female *O. tanneri*.

FIG. 3. Two mason nests of *O. tanneri*. Note size and color differences in mud pellets.

FIG. 4. Bottom view of 2 mason nests of *O. tanneri*. Note the patched appearance of the surface.

FIG. 5. Mason nest of *O. longula* with young larvae feeding on pollen provisions.

FIG. 6. Opposite view of nest in Fig. 5 illustrating contour and texture of surface.

around the cells, and the nest was covered with flat mud pellets that resulted in a surface covered with small patches (Fig. 4). In profile, the finished nests were flat beneath with round sides. The nests measured 24 × 35 mm and 29 × 38 mm. Maximum thickness was 10 mm.

The length of cells averaged 12 mm, width 6 mm, and depth 6 mm. The cell walls were smooth, but not polished; the inner surface of the cell cap was irregular.

Larval Habits.—In most cells the cocoon filled the entire cell. Cocoons were spun by attaching a loosely woven network of white silk to the walls. A thin sheet of silk was applied inside the network that enclosed the larva. Inside this layer thin longitudinal strips of fecal material were deposited on the inner walls from near the top to the bottom. Then, another layer of silk was added over the fecal material making the cocoon inside smooth and shiny. The apical nipple was small, flat, circular, white and spun beneath the first layer of silk. The nipple inside the cocoon was dark amber with loose strands of silk evident. Many fecal pellets covered the anterior end of the cocoon; they ranged in color from dark amber to light yellow. Their uniform shape was bowed medially, the top of the bow was flat with an impressed longitudinal line; the pellet ends were blunt with fine points. The pellets averaged 1 mm in length.

Nest Provisions.—Traces of pollen attached to the cocoons and exines in feces were an unknown species of Umbelliferae. All the cells contained cocoons when the nests were located so size and shape of the provision are unknown.

Overwintering.—The nests contained adults when found on May 27, 1972. It is likely that this species overwintered as an adult. Three of the cocoons contained dead larvae, but these were black and dried which indicated that they had died the previous summer.

Sex Ratio.—Two females and one male emerged.

Parasites.—Five of the six cells in one nest contained adults of the chrysid wasp, *Chrysura pacifica* (Say).

OSMIA (*ACANTHOSMOIDES*) *LONGULA* CRESSON

(Figs. 5, 6)

Nesting Site.—A sparsely timbered slope facing west with abundant broken rock scattered among many species of annual and perennial plants. The site was located above Beaver Creek, Cache Co., Utah, at an elevation of 8,000 ft. One completed nest was attached to the side of a stone beneath a slight overhang.

Nest Construction.—The nest was initiated in a small indentation on the east side of a rock. The first cell was started by making an oval ring around the indentation from 1 mm thick mud pellets, then arching the walls inward forming the cell. The inside diameter of the cell was 16 mm long, 9 mm wide, and 7 mm deep; its inner walls were smooth

but not polished. The cell was capped by mud pellets. Next, a layer of masticated leaf material was applied over the cell walls; this material was tightly appressed to the mud walls and covered the outer surface of the cell. This layer of plant material is visible in Fig. 5. Three additional cells were attached to the side and above the first. Thus, portions of the first cell became the base for additional cells (Fig. 5). Additional cells were also coated with plant material. The outer surface of the nest was plastered with mud, but some plant parts were also incorporated. The outline of the underlying compartments was evident (Fig. 6) after the nest was plastered and in profile the nest outline was crenulate. The dimensions of the nest were 34 × 24 mm.

Larval Habits.—The cocoon was formed as in *O. tanneri* with the same pattern and number of layers of silk. In cocoons of *O. longula*, the initial layer of silk adhered more closely to the cell walls and was thicker. The striped fecal material between the layers of silk was darker as was the inner shiny, polished cocoon. The nipple was larger, flat, white, and covered by a layer of attached darker silk. The entire cocoon was larger (14 mm) and barrel shaped.

Sex Ratio.—All the cell contents died except for one male.

Nest Provisions.—Pollen remaining in the cells was identified as belonging to the plant family Leguminosae.

Overwintering.—When the nest was collected on June 1, 1972, it contained 4 early instar feeding larvae, Fig. 5. During that summer one larva molted to an adult and entered diapause.

ACKNOWLEDGMENTS

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